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ABSTRACT

A professional development program was designed and implemented to help teachers gain new research knowledge and skills. An interactive research strategy was used to bring teachers, researchers, and staff development personnel together as a team to examine classroom problems and to plan a means to disseminate research findings. This process introduced teachers to all phases of a research project and helped them to develop research skills that could be used later as they encountered other problems. To evaluate the project's effectiveness, teachers were asked to respond to a Stages of Concern questionnaire. This instrument measured practitioner reaction to an innovation by determining individual attitudes toward it, ranging from mere awareness to enthusiastic espousal. Thirteen teachers, five university researchers, and three staff developers were organized into six research teams based on research interests expressed by the participants. Teachers were provided with approximately ten hours of initial training in general research practices and procedures and in the essential features of interactive research and development. Each team conducted a research project on various topics using an appropriate methodology and design and collaboratively planned a means to disseminate their findings. An evaluation of the project concluded that participating teachers demonstrated positive changes in concerns about the use of research findings and practices in teaching and that they gained significant research-teaching-development skills. (JD)

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# THE EFFECTS ON TEACHERS OF PARTICIPATION IN AN INTERACTIVE RESEARCH AND DEVELOPMENT PROJECT

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Paper presented at the annual meeting of the
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## Abstract

This paper describes an interactive research and development project that has been successful in training teachers to use research findings and practices in their teaching. Classroom teachers were organized into interactive research and development teams along with staff developers and university researchers. Each team conducted a field-based research project. Also reported are the results of an investigation of certain types of changes teachers made as a result of participating in this program. Participating teachers demonstrated a significant change in concerns about the use of research findings and practices in teaching and a significant increase in research-teaching-development skills.

# THE EFFECTS ON TEACHERS OF PARTICIPATION IN AN INTERACTIVE RESEARCH AND DEVELOPMENT PROJECT[1]

Leslie L. Huling

Demands for excellence bombard the classroom practitioner. Over the past several decades, a large body of research on the improvement of classroom practice has been produced. Yet, much useful research is never applied at the classroom level (Bain & Groseclose, 1979). In most cases, teachers do not possess the skills to use or conduct research effectively. In addition, many teachers are not interested in research, nor do they recognize the benefits to be gained from using research in teaching.

The problem described in the preceeding statements led the Texas Tech University Teacher Corps staff in the Spring of 1980 to the decision to offer teachers in their project schools the opportunity to participate in a professional development program which would be designed to help teachers gain new research knowledge and skills. This paper will describe the process used to plan and implement this professional development program and will report the results of a study which investigated certain types of changes teachers made as a result of participating in this program.

## Planning the Program

Once the decision to offer such a program was made, the Teacher Corps project's research coordinator initiated a review of the professional literature to identify a program which could be successfully adapted to the

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local situation. After completing a preliminary review of the literature, the decision was made that the new professional development program would be some type of action research project in which teachers could become actively engaged in research on topics of their choice in their own classrooms.

Several models of action research were identified and the model which was ultimately selected was the Interactive Research and Development (IR&D) model which was developed and field tested by the Far West Laboratory for Educational Research and Development (Tikunoff, Ward & Griffin, 1979). IR&D is a research strategy that brings teachers, researchers, and staff development personnel together to inquire as a team into those questions of concern to classroom teachers and to collaboratively plan a means to disseminate their research findings. Working with parity and equal responsibility, team members collaborate and identify, inquire into, and resolve the problem/concerns of classroom teachers. Through this process, teachers are introduced to all phases of a research project and begin to develop research skills which they can use later as they encounter future classroom problems in need of investigation.

For a number of reasons, the IR&D model seemed most appropriate for use in a Teacher Corps professional development program. First of all, through the Teacher Corps project, there already existed a collaborative relationship between the local university which would provide the researchers and the school district which would provide the classroom teaachers. Since Teacher Corps is charged with providing staff development opportunities for teachers in the project schools, it was a natural step for the Teacher Corps project to provide the staff developers needed to serve on the IR&D teams. Also, one of the Teacher Corps mandates is to disseminate the successful procedures and

practices developed by the project so the IR&D model was especially appropriate in that it had the dissemination feature included as a major component.

Once the professional development program was conceptualized, the focus changed to designing a study to evaluate the effectiveness of the new program. Two questionnaires from the original Far West IR&D study, the Research-Teaching-Development Skills Questionnaire and the Professional Development Questionnaire (Tikunoff, et al., 1979), were selected as being useful; however, neither instrument provided insight into the affective dimension. Since it was believed that teachers' continued use of research in their teaching after the completion of the project would be dependent upon a change in their attitude about the need to use research, it was deemed important to study the affective aspects of what was happening to teachers in the project. At this point, personnel at the Research and Development Center for Teacher Education at the University of Texas were consulted. The Concerns-Based Adoption Model (CBAM) project at the Texas R&D Center has more than a decade of experience studying teachers involved in new and innovative educational programs. Through consultation with the CBAM staff, it was decided that one dimension of the model, Stages of Concern, would be most useful in studying changes in teachers' attitudes and concerns about using research in their teaching. The Stages of Concern Questionnaire About the Innovation, a two-part instrument consisting of 35 Likert-type items and an open-ended statement section, was selected as the primary instrument to be used in the study.

The Stages of Concern About the Innovation Questionnaire assesses seven different stages of concern about the innovation which are described in Figure 1.

Figure 1

Stages of Concern About the Innovation

0 Awareness: Little concern about or involvement with the innovation is indicated.

1 Informational: A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unworried about herself/himself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner such as general characteristics, effects, and requirements for use.

2 Personal: Individual is uncertain about the demands of the innovation, her/his inadequacy to meet those demands, and her/his role in relation to the reward structure of the organization, decision making, and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.

3 Management: Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.

4 Consequence: Attention focuses on impact of the innovation on students in her/his immediate sphere of influence. The focus is on relevance of the innovation for students, evaluation of student outcomes, including performance and competencies, and changes needed to increase student outcomes.

5 Collaboration: The focus is on coordination and cooperation with others regarding use of the innovation.

6 Refocusing: The focus is on exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. Individual has definite ideas about alternatives to the proposed or existing form of the innovation. (Hall, George & Rutherford, 1979, p. 7)

The Concerns-Based Adoption Model assumes that nonusers of an innovation will have relatively more intense Stages 0, 1 and 2 concerns and less intense Stages 4, 5, and 6 concerns. As use of innovation begins, Stages 0, 1, and 2 concerns will decrease in intensity and Stage 3 concerns will become more intense. With increased experience and sophistication, Stages 4, 5, and 6 concerns will become relatively more intense, while Stages 0, 1, 2 and 3 concerns further decrease in intensity (Rutherford & George, 1978, p. 3).

There are five items on the questionnaire for each Stage of Concern. The instrument can be used either as it is written in general terms which refer only to "the innovation," or the innovation can be defined and the wording of the questions adapted accordingly. For this study, the innovation was defined as "the use of research findings and practices in your teaching" and the questions were adapted by the researcher and then approved by the original developers of the instrument.

A pretest-posttest control group design was selected for the study. Treatment group subjects would be teachers who volunteered to participate in the IR&D project and control subjects would be public schools teachers who were not participating in the project but who were enrolled in one or more graduate education courses at the university. The rationale for selecting control subjects in this manner, was to test whether participation in the IR&D project would result in changes above and beyond those that would normally occur as a result of being enrolled in traditional graduate education courses.

## Implementing the Program

In early fall 1980, 13 teachers from the three Teacher Corps project schools volunteered to participate in the IR&D project. Five university professors were selected to serve as researchers in the project, and three

Teacher Corps staff members were selected to serve as staff developers. The participating teachers were enrolled in an independent research course at Texas Tech University and thus were provided with the opportunity to earn three hours graduate course credit in education for their participation in the project. Teachers in the project were pretested on September 11, 1980. A total of 18 teachers had volunteered to be in the control group and they were also pretested within the same week. Demographic data were collected on all teachers in the study.

Teachers in the project were provided with approximately 10 hours of initial training in general research practices and procedures and in the essential features of interactive research and development. A noted author in the area of collaborative action research, Gerald Pine from Oakland University in Rochester, Michigan, worked with the participants during one day of the initial training. Teacher evaluations from the training session were extremely positive.

Within a week after the initial training, the project coordinator had organized six research teams based on the research interests and team member preferences expressed by the participants. Each team consisted of one to three teachers, one researcher, and one staff developer. Two teams included elementary teachers, two included junior high teachers, and two included high school teachers. Each team was charged with the responsibility of identifying a research question, conducting a research project using an appropriate methodology and design, and collaboratively planning a means to disseminate their research findings. Each team was also required to submit a research report and a dissemination report when its work was completed. The teams were allowed flexibility in determining the time frames for their studies. Although the project coordinator encouraged the teams to at least complete the

research phase of their study by the end of the semester, the final decision on the time frame was left entirely to the individual teams.

One week after the initial training, all research teams met under the direction of the project coordinator for their first team meeting. From that point on, each team met and worked independently. The research topics the six teams selected were impulsivity in young children, attitudes toward reading, peer-tutoring, math teachers' concerns about team teaching, cognitive restructuring and mastery learning, and attitudes toward handicapped students. Throughout the study, the project coordinator assisted the teams by relaying to researchers and staff developers the information that the teacher participants provided by responding to open-ended questions. Also, the project coordinator organized monthly meetings of the researchers and staff developers for the purpose of discussing progress and problems related to the project. The project coordinator also monitored the progress of each research team through team meeting logs submitted by each team after each of their meetings.

Finally, the project coordinator organized a reporting session for all project participants at the end of the semester so that all participants could be informed of the activities of all of the teams in the project. At this session, four teams had completed the research phase of their projects while the other two teams were still in the research phase of their projects. Teachers in the project were posttested on December 11, 1980, and the control group was posttested within the same week. When formal data collection was completed the project coordinator decided to informally interview each teacher in the project for the purpose of gaining more insight into changes in attitudes and behaviors that might be related to participation in the project. The informal interviews began shortly after the Christmas break and were

completed in approximately two weeks.

## Evaluating Program Effectiveness

### Hypotheses of the Study

The data gathered in the study were used to test the following four hypotheses:

1. Teachers who participate in the IR&D project will demonstrate significantly greater changes in concerns about the use of research findings and practices in their teaching than those who do not participate in an IR&D project.

2. Teachers who participate in an IR&D project will demonstrate significantly higher research-teaching-development skills than those who do not participate in an IR&D project.

3. Teachers who participate in an IR&D project will demonstrate significantly higher interest in professional development than those who do not participate in an IR&D project.

4. Teachers who participate in an IR&D project will demonstrate a positive attitude toward the use of research findings and practices in teaching.

### Measures

Both the Stages of Concern Questionnaire and the Stages of Concern open-ended statements were used to test the hypothesis concerning teachers' changes in concerns about the use of research findings and practices in their teaching.

During a one-week test-retest study conducted by the University of Texas Research and Development Center on the Stages of Concern Questionnaire, stage score correlations ranged from .65 to .86, with four of the seven correlations being above .80. Estimates of internal consistency (alpha coefficients) ranged from .64 to .83, with six of the seven coefficients being above .70. Hall et al. (1979) conducted a series of validity studies, all of which provided increased confidence that the SoC Questionnaire measures the Stages of Concern hypothesized by the developers of the instrument (p. 20).

The Research-Teaching-Development Skills Questionnaire was used to test the hypothesis concerning research-teaching-development skills. This questionnaire was adapted by Gary Griffin of Teachers College, Columbia University from a questionnaire published by the American Educational Research Association (Worthen, 1975, pp. 13-16). The Professional Development Questionnaire developed by Robert McClure of the National Education Association was used to test the hypothesis concerning interest in professional development. A reliablity study of the Professional Development Questionnaire, based on 42 educators, yielded a test-retest correlation of .79. Finally, informal interviews were used to test the hypothesis concerning attitudes toward the use of research findings and practices in teaching.

Data Analysis

The three questionnaires used in the study were analyzed using analysis of covariance (ANCOVA). Prior to using ANCOVA, a multiple regression was performed on the data from the Professional Development Questionnaire and the Research-Teaching Development Skills Questionnaire in order to identify variables that were highly correlated to questionnaire results. The total score from each instrument was used as the dependent variable in each multiple regression run. A multiple regression was not performed on the Stages of Concern Questionnaire because the developers of the instrument have found "no outstanding relationships between standard demographic variables and concerns data" (Hall et al., 1979, p. 52).

The open-ended section of the SoC Questionnaire was analyzed using guidelines outlined in A Manual for Assessing Open-Ended Statements of Concern About an Innovation (Newlove & Hall, 1976). The researcher rated the open-ended responses by sentence while Beulah Newlove, the primary author of the open-ended statements assessment manual, rated the open-ended responses

holistically. The two raters then met together, discussed their interpretations, and reached consensus on the interpretation of each response. Information from the informal interviews was analyzed by the researcher and reported descriptively.

## Findings from the Study

### Stages of Concern Questionnaire

An ANCOVA was performed on the Stages of Concern Questionnaire by item and by stage. The posttest scores were analyzed by the two groups, treatment and control. The pretest score was the covariate.

Hypothesis 1 dealt with teachers' concerns about the use of research findings and practices in teaching. According to concerns theory, as a person becomes a user of an innovation, his or her Stages 0, 1, 2, and 3 concerns decrease in intensity and their Stages 4, 5, and 6 concerns increase in intensity (Rutherford & George, 1978, p. 3). Using an ANCOVA and controlling for pretest, both the treatment group's and control group's posttest profile would be the same if neither group had experienced a change during the treatment. However, as Figure 2 indicates, when comparing the treatment group's concerns in each stage to the control group's, there is movement on the part of the treatment group in each stage in the direction hypothesized, with Stages 0, 3 and 6 being significantly so at the .05 level of significance. In addition, the ANCOVA also revealed significant difference on 10 items.

Additional information can be gained from the Stages of Concern Questionnaire by interpreting the overall shape of the profile, (Hall et al., 1979, p. 29). Pretest and posttest profiles of the treatment and control groups are shown in Figure 3. Both groups' pretest profiles can be

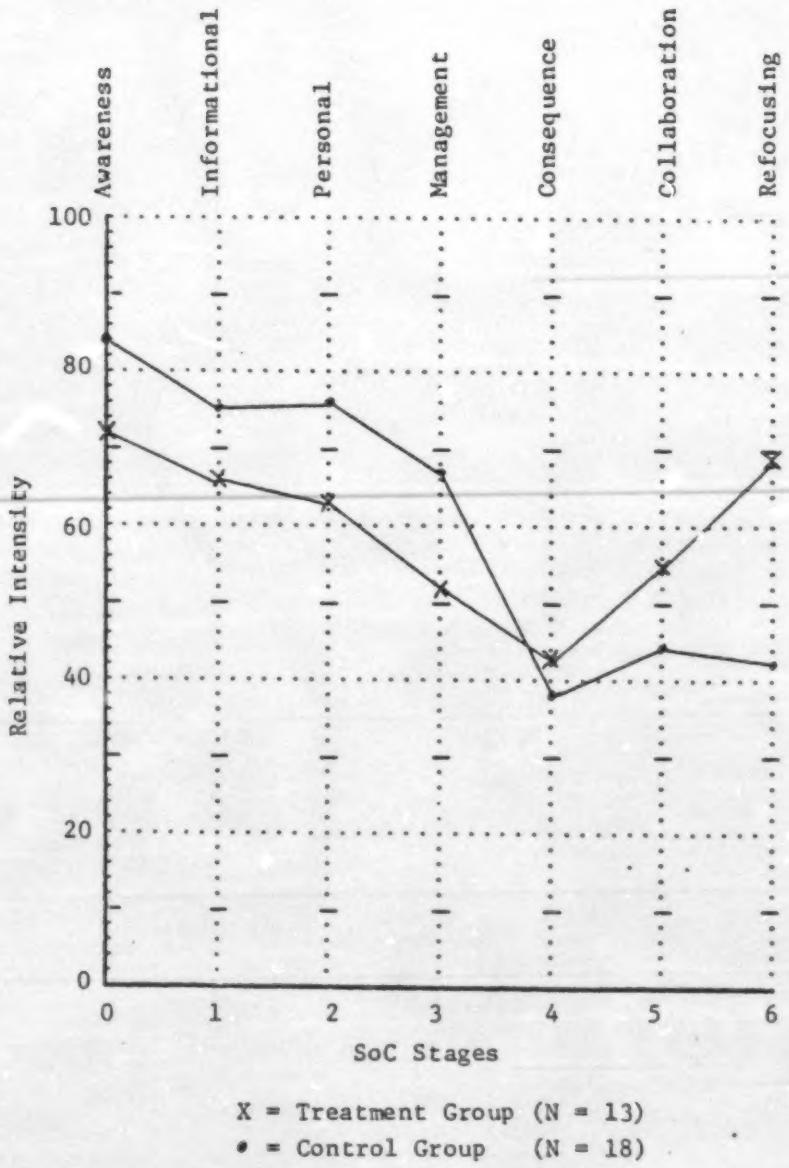


Figure 2. Stages of concern posttest profiles when controlling for pretest.

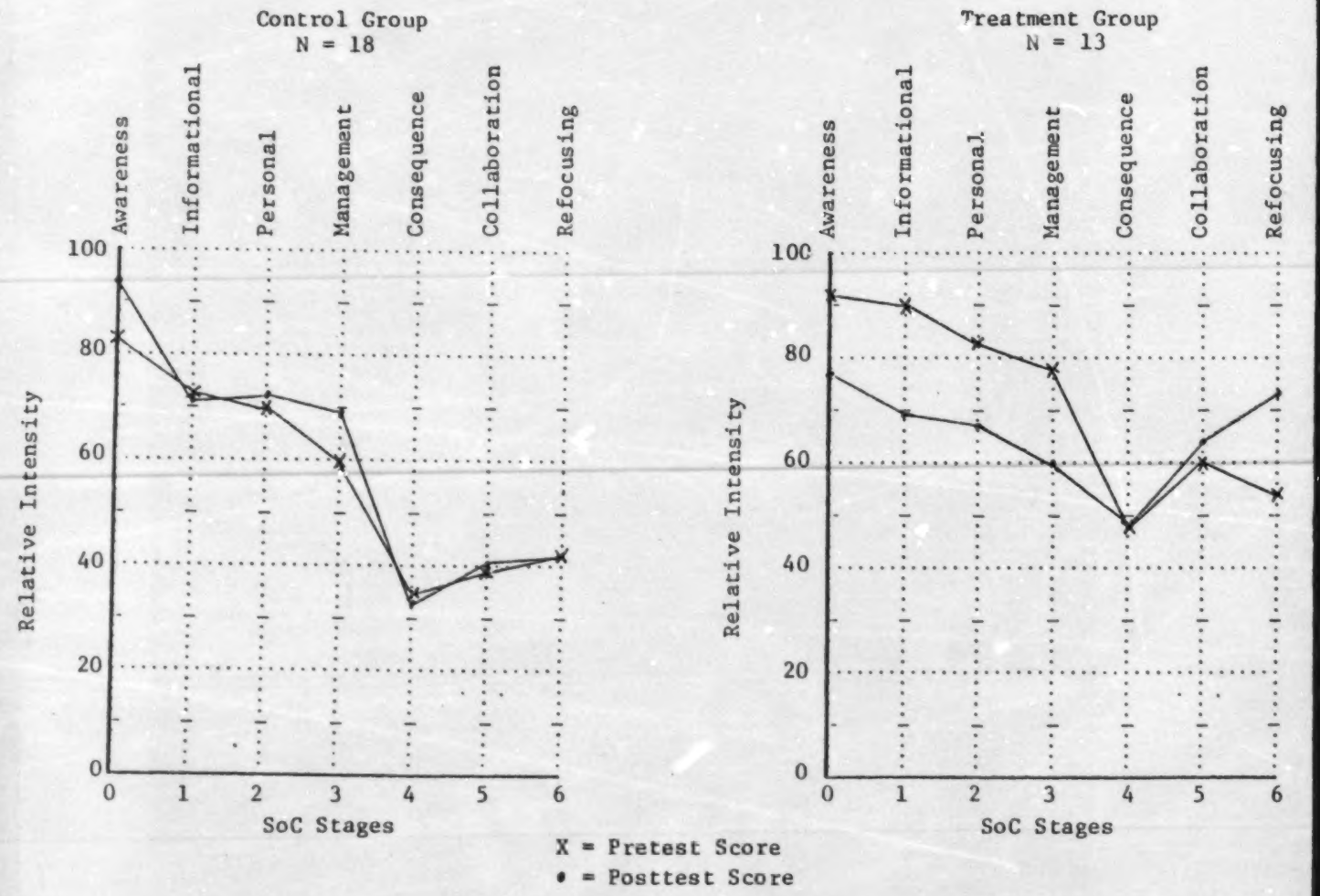


Figure 3. Stages of concern pretest and posttest profiles of treatment and control groups.

interpreted to be "nonuser" profiles--that is, both show relatively intense concerns in Stages 0, 1, 2 and 3 and less intense concerns in Stages 4, 5, and 6. Two noticeable differences are present in the treatment and control groups' pretest profiles. The first difference is that all of the treatment group's concerns are more intense, about 10 to 20 percentage points more, than the control group's concerns. This increased intensity of concerns can be explained by the fact that the treatment group, at the time of responding to the pretest, had already made a commitment to try the innovation. Therefore, it is understandable that the treatment subjects had more intense concerns since they knew that very shortly they were to encounter the innovation. The second difference from a typical nonuser profile is the slight peak on Stages 5 of the treatment group's profile. Stage 5 indicates collaboration concerns and all members of the treatment group, at the time of responding to the pretest, had volunteered to participate in a project in which they were to work with other teachers, researchers, and staff developers. Since all treatment subjects were apparently willing to work with others, it is again understandable that the group's collaboration concerns would run higher.

The control group's posttest profile was highly similar to its pretest profile. Posttest scores on five of seven stages remained within 2 percentage points of pretest scores. Stages 0 and 3 concerns increased approximately 10 percentage points. These increases may be due to the time of the school year during which the posttest was administered. The posttest was administered during the last week of the fall semester, a time that is normally quite busy for teachers who are enrolled in one or more graduate education courses. What the control group might have been indicating with the increased Stages 0 and 3 concerns was, "We have even less concern about the innovation" (Stage 0), and, "We have little time for the tasks we already have" (Stage 3).

On the other hand, there was considerable change between the treatment group's pretest and posttest profiles. Stages 0, 1, 2 and 3 concerns all decreased in intensity by 15 to 20 percentage points. Stages 4 and 5 concerns remained basically the same, while Stage 6 concerns increased in intensity by approximately 20 percentage points. The decrease in the lower stage concerns can be interpreted to mean that as the teachers began to implement the innovation in their own settings their informational and personal concerns were being resolved. The higher Stage 6 concern could indicate that the group has other ideas about the innovation, ideas about how to improve the use of the innovation, or that they are considering replacing the innovation with another. In this case, open-ended concerns statements and statements made by the teachers during informal interviews indicate that participants were not considering replacing the innovation but rather were considering ways to adapt it to meet their individual situations. This can be explained by the fact that throughout the IR&D project, participants were encouraged to adapt research findings and practices to meet the needs of their individual classrooms. Having been exposed to this type of encouragement, it is understandable that the treatment group's Stage 6 refocusing concerns would increase.

Stages of Concern Open-Ended Responses

The Stages of Concern Questionnaire is interpreted by comparing the individual stage scores to each other. According to Hall et al. (1979, p. 49), the total score on the instrument has no unique meaning. Because of this fact, it is difficult to get a single measure of how a group's concerns are changing over time using the 35-item questionnaire alone. However, an analysis of the open-ended Stages of Concern statements is one way to acquire a single estimate of concerns for testing the first hypothesis.

Beulah Newlove, primary author of A Manual for Assessing Open-Ended Statements of Concern About an Innovation (1976), made an analysis of all of the subjects' responses to the open-ended statement, "Please write a brief paragraph (3-5 sentences) about your concerns and feelings related to the use of research findings and practices in your teaching." The holistic interpretations of the open-ended responses are listed in Table 1.

In reporting her impressions of the Stages of Concern open-ended responses for this study, Newlove stated:

> While the control group remains high in awareness and informational concerns indicating nonuse, the treatment group shows steady and consistent movement toward implementation of the innovation. When considering the treatment group as a whole, they have moved from a nonuser to a user profile in terms of their concerns.

Research-Teaching-Development Skills Questionnaire

The second hypothesis dealt with the teacher's research-teaching-development skills. In order to test the hypothesis, an ANCOVA was performed on the data from the Research-Teaching-Development Skills Questionnaire. A multiple regression analysis of the data, using the posttest total score as the dependent variable, revealed that the only significant predictor variable was the pretest score. Therefore, the posttest scores on the Research-Teaching-Development Skills Questionnaire were analyzed by the two groups, treatment and control. Also, the posttest score on each item was analyzed by group, treatment and control. The pretest score was the covariate in all analyses. When controlling for pretest, the results revealed significant differences between the two groups on the total instrument at the .01 level of significance. In addition, five items were also found to be significant (see Table 2).

Table 1

Holistic Interpretation of SoC Open-Ended Responses

(By Predominant Stage)

| Treatment Group | | Control Group | |
|---|---|---|---|
| Pretest | Posttest | Pretest | Posttest |
| 3 | 4 | 0 | 1 |
| 1 | 3/4 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 2 | 4 | 1 | 1 |
| 2 | 3/2 | 0 | 0 |
| 1 | 1 | 0/1 | 1/0 |
| 1 | 4 | 0 | 0 |
| 0 | 3 | 0 | 0 |
| 1 | 3 | 0 | 0 |
| 1/3/4 | 3 | 0 | 0 |
| 4 | 5 | 0 | 3 |
| 1 | 5 | 0/1 | 0/1 |
| 0 | 2 | 0/1 | |
| | | 1/2 | 1/0 |
| | | 1 | 4 |
| | | 4 | 4 |
| | | 1 | 3 |

Table 2

Significantly Different Items from the Research-Teaching-Development Skills Questionnaire

(Covariate Pretest)

| Item | Statement | Treatment Group | | Control Group | | p |
|---|---|---|---|---|---|---|
| | | Unadj. M | Adj. M | Unadj. M | Adj. M | |
| 20 | Knowledge of general principles of research design | 2.54 | 2.56 | 1.56 | 1.54 | .014 |
| 23 | Ability to operationalize a research design into specific research procedures | 2.23 | 2.22 | 1.44 | 1.44 | .026 |
| 27 | Ability to identify and articulate a researchable problem | 3.62 | 3.51 | 2.33 | 2.41 | .010 |
| 37 | Ability to use formal and informal systems of recording observations of behavior | 3.15 | 3.17 | 2.44 | 2.43 | .047 |
| 56 | Ability to plan an effective development program or project | 2.85 | 2.97 | 2.11 | 2.02 | .033 |

Professional Development Questionnaire

The third hypothesis dealt with the teacher's interest in professional development. In order to test the third hypothesis, an ANCOVA was performed on the data from the Professional Development Questionnaire. A multiple regression analysis of the data, using the total posttest score as the dependent variable, revealed that pretest score and teaching level were significant predictor variables for the first part of the instrument (subscale 1) and for the total instrument, and that pretest score, teaching level, and number of educational magazines and journals to which the teacher subscribed were the significant predictor variables for the second part of the instrument (subscale 2). Therefore, the posttest score for each item, the first subscale, and the total instrument were analyzed by groups, treatment and control, using the pretest score and teaching level as covariates. The posttest score for subscale 2 was analyzed by the two groups, treatment and control, using the pretest score, teaching level, and number of educational magazines and journals to which the teacher subscribed as covariates. The results revealed no significant differences between the two groups. However, a significant difference was found on 4 items in subscale 1 (see Table 3).

Informal Interviews

The fourth hypothesis stated that teachers who participate in an IR&D project will demonstrate a positive attitude toward the use of research findings and practices in their teaching. Information with which to test this hypothesis was gathered by the researcher through a set of informal interviews.

Two questions asked during the interview related directly to attitudes. These two questions were (1) "In what ways, if any, have your attitudes toward the use of research in teaching changed?" and (2) "To what degree has your

Table 3

Significantly Different Items from Subscale 1 of the Professional Development Questionnaire

(Covariates Pretest and Teaching Level)

| Item | Statement | Treatment Group | | Control Group | | p |
|---|---|---|---|---|---|---|
| | | Unadj. M | Adj. M | Unadj. M | Adj. M | |
| 1 | The ways students learn (e.g., learning styles, motivation, reinforcement, retention) | 5.00 | 5.02 | 4.33 | 4.31 | .023 |
| 7 | The performing arts (e.g., drama, music) | 3.15 | 2.93 | 3.56 | 3.72 | .036 |
| 9 | Bilingual and/or multicultural education | 3.46 | 2.70 | 3.00 | 3.54 | .037 |
| 23 | New curricula | 2.85 | 2.79 | 3.67 | 3.70 | .050 |

participation in IR&D made you more likely to consult or conduct research to help solve classroom problems?" Another question which related quite closely to attitudes read, "To what degree has participation in IR&D been a worthwhile experience for you; in your opinion, would it be a worthwhile experience for your peers?" In addition to the responses to these specific questions, teachers also made other statements which reflect attitudes and these are also reported.

Nine of 13 participants reported experiencing an attitude change about the use of research in their teaching. All 9 indicated that they are now more comfortable with research and are therefore more likely to consult or conduct research to help solve classroom problems. Some of the comments made in regard to the two attitude questions included:

> I'm more comfortable now with research. Before, I was always on the other side of the fence. It's more meaningful if you do it yourself.
>
> Now I see that using research is not all that hard.
>
> I plan to use more research in my teaching, but I'm still going to be very discriminating about which research I will use.

One teacher reported that she would probably use more research now that she is more aware of what procedures researchers use. Two teachers reported that they have not experienced attitude changes toward the use of research in teaching because they have always used research findings and practices in their teaching. However, one of these two did say, "I've learned that a little extra preplanning can yield a lot more useful information." Finally, one teacher reported that while she would like to use more research in her teaching, she still does not feel that research is very readily available to teachers. She also said that she has always tried new things to improve her teaching.

Conclusions of the Study

All of the participants said they felt that participating in the project was a worthwhile experience and one that they would recommend for their peers. Three of the 13 expressed concern about the large amount of time they had spent in the project and indicated that they would have to wait and see what happens before they could judge whether the time spent was a good investment in terms of the benefits gained. Most of the teachers reported that they enjoyed the experience.

Many teachers made statements during the interview that indicated positive attitudes about IR&D and about using research in teaching. No statements which indicated negative attitudes were made. Examples of some of the comments made during the interviews included:

> The training session really got me excited. It made me feel like something really important could come out of this.
>
> I loved it. I think it is one of the most rewarding and informative ways you could ever earn credit.
>
> This was a great experience. It ought to be a part of every teacher's plan. This is really continuing education.
>
> I believe in IR&D so strongly. It is definitely a good thing. It definitely works in classes.
>
> I enjoyed the experience and it was useful. I can see the results. I recommend it.
>
> It was definitely beneficial. I didn't plan to get that involved.
>
> The IR&D course meets individual needs. I have no suggestions to improve that.
>
> It changed my status in the school. It made me a part of the faculty. It gave me more self-confidence in my ability to teach.

Based on the findings of this study, hypotheses 1, 2 and 4 were confirmed and hypothesis 3 was rejected. These findings have resulted in the following

conclusions:

1. Teachers who participated in an IR&D project did demonstrate significantly greater changes in concerns about the use of research findings and practices in teaching than those who did not participate in an IR&D project.

2. Teachers who participated in an IR&D project did demonstrate significantly higher research-teaching-development skills than those who did not participate in an IR&D project.

3. Teachers who participated in an IR&D project did not demonstrate significantly higher interest in professional development than those who did not participate in an IR&D project.

4. Teachers who participated in an IR&D project did demonstrate a positive attitude about the use of research findings and practices in teaching.

## Other Project Outcomes

A number of positive outcomes not directly related to this study have resulted from the IR&D project. One such outcome was demonstrated at the reporting session at the end of the semester. The teacher participants were quite enthusiastic about their own research and were excited to hear about the research of the other teams in the project. As the teachers were reporting on their work, they were comfortably and correctly using various research terms. The group was obviously much more knowledgeable about research practices and procedures than when they entered the project 13 weeks earlier. One of the teachers in the project told the project coordinator that for the first time in her professional career she understood how she could be accountable for the learning that was taking place in her classroom.

Another postive outcome of the project has been the involvement of school district central office consultants. Three of the six teams involved school district consultants. Not only was the recognition from the consultants a positive thing for the teachers involved, but the interactions have helped

strengthen the working relationship between personnel of the school district and the university's college of education.

Another positive aspect of the project has been the benefits gained by researchers and staff developers. Almost all of the researchers and staff developers reported having positive experiences, and one university professor related that his experiences in IR&D have been some of the most worthwhile experiences he has had during his years at the university.

Finally, another outcome of the IR&D project is that it has given university personnel more ready access to public school classrooms in which to conduct educational research. As a result of the research conducted through this project, a number of the teams have submitted articles about their work to various professional journals including Journal of Teacher Education, Educational Leadership, The Mathematics Teacher, Texas Outlook, and the NASSP Bulletin.

## Discussion and Implications

A number of implications can be drawn from the IR&D project and the related study. This study indicated that the IR&D model is a useful tool in providing teachers with professional development that will allow them the opportunity to develop research skills and a more positive attitude about incorporating research into their teaching. This promising model merits additional attention from those persons charged with providing professional development for teachers. Colleges of education need to consider incorporating an IR&D course into their curriculum in order to address the research needs of public school practitioners. By doing this, teachers can become involved in research on topics of concern to them and can learn valuable research skills which they can apply to future situations. Also,

school district staff developers need to consider integrating the IR&D process into more traditional programs of staff development in order to provide teachers with increased opportunities to develop research skills. Additional benefits that can be gained through IR&D is that university researchers can be provided with more ready access to public school settings and thus increase the amount of field based research being produced and that the working relationship of university and public school personnel can be enhanced by providing persons from both institutions the opportunity to work together to study questions of mutual concern.

Several observations need to be made about the measures used in this study. The Stages of Concern Questionnaire and open-ended statements were particularly well-suited to investigating the affective dimension of what was happening to teachers in the project. In this case teachers' continued application of the concepts learned in the project was entirely their own personal decision since the program was in no way mandated by the district or the school. This being the case, the long-range success of the project was entirely dependent upon teachers developing a positive attitude toward incorporating research into their teaching. Therefore, having a measure that focused on teachers concerns and attitudes was extremely beneficial. In the past, these measures have been used extensively with various innovations that teachers are implementing in their classrooms. It now appears that the Stages of Concern Questionnaire and open-ended statements can also be quite useful in studying teachers' concerns about various staff development programs and their voluntary participation in new and innovative projects.

In regard to the Professional Development Questionnaire, the statistical nonsignificance on the responses may not mean that interest in professional development has remained stable. It is quite possible that as a result of

participating in an IR&D project, teachers have refined their interests so that even though they may still have the same number and/or intensity of interests, the areas they are now interested in may be quite different from those that they were interested in initially. This may mean that this questionnaire is not an appropriate one for use with participants in this type of project and that other instruments which measure the same or similar phenomena need to be considered.

Finally, several recommendations for future study can be made. Additional research is needed to further explore the collaborative aspects of IR&D for purposes of refining the process. A study is needed to investigate the long-range behavior and attitude changes of teachers who participate in IR&D. A longer treatment period than what was used in this study is recommended for investigation of initial changes in teachers. Research is needed to understand, classify, and rate the different types and qualities of experience teachers have in IR&D and to study the effectiveness of these various experiences. Additional studies are needed to evaluate the research produced through IR&D and to study the processes used to disseminate the findings produced through IR&D.

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